

From the INTERNATIONAL BUREAU

**PCT**

**NOTIFICATION OF ELECTION**

(PCT Rule 61.2)

To:

Commissioner  
US Department of Commerce  
United States Patent and Trademark  
Office, PCT  
2011 South Clark Place Room  
CP2/5C24  
Arlington, VA 22202  
ETATS-UNIS D'AMERIQUE  
in its capacity as elected Office

<b>Date of mailing (day/month/year)</b> 17 July 2001 (17.07.01)	
<b>International application No.</b> PCT/US00/07094	<b>Applicant's or agent's file reference</b> 415000-
<b>International filing date (day/month/year)</b> 16 March 2000 (16.03.00)	<b>Priority date (day/month/year)</b> 07 September 1999 (07.09.99)
<b>Applicant</b> SHAN, Zhiping et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:  
05 April 2001 (05.04.01)

☐ in a notice effecting later election filed with the International Bureau on:  
\_\_\_\_\_

2. The election ☒ was  
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

<b>The International Bureau of WIPO</b> 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	<b>Authorized officer</b> H. Zhou Telephone No.: (41-22) 338.83.38
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## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>415000-</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/US 00/ 07094</b>	International filing date (day/month/year) <b>16/03/2000</b>	(Earliest) Priority Date (day/month/year) <b>07/09/1999</b>
Applicant <b>TECHNISCHE UNIVERSITEIT DELFT et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

## 1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.



as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.

1  
☐ None of the figures.

# INTERNATIONAL SEARCH REPORT

Inte. onal Application No

PCT/US 00/07094

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C01B33/12

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C01B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 795 555 A (ALIVE KESHAVARAJA ET AL) 18 August 1998 (1998-08-18) figure 2; example 1	16-20
Y	US 5 538 710 A (GUO CHANG-JIEY ET AL) 23 July 1996 (1996-07-23) column 4, line 66,67; claims 16-18; figure 11; example 7	16-20
A	US 5 849 258 A (CARRAZZA JOSE ET AL) 15 December 1998 (1998-12-15) examples 1,2	16-20
A	US 5 672 556 A (TANEV PETER T ET AL) 30 September 1997 (1997-09-30) abstract	1
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

7 June 2000

Date of mailing of the international search report

20/06/2000

Name and mailing address of the ISA

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Authorized officer

Clement, J-P

# INTERNATIONAL SEARCH REPORT

International Application No

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 919 430 A (HASENZAHN STEFFEN ET AL) 6 July 1999 (1999-07-06) column 3, line 58 -column 4, line 65 ---	1
E	WO 00 15551 A (UNIV DELFT TECH ;ABB LUMMUS GLOBAL INC (US)) 23 March 2000 (2000-03-23) claims 1-20 -----	1-13, 16-20, 23,24

# INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5795555	A	18-08-1998	NONE	
US 5538710	A	23-07-1996	CA 2164671 A	15-06-1996
US 5849258	A	15-12-1998	BR 9703486 A	22-12-1998
			CA 2205944 A	06-12-1997
			EP 0811423 A	10-12-1997
			JP 10087321 A	07-04-1998
			US 5902564 A	11-05-1999
US 5672556	A	30-09-1997	US 5840264 A	24-11-1998
			US 5712402 A	27-01-1998
			US 5800800 A	01-09-1998
			US 5855864 A	05-01-1999
			US 5785946 A	28-07-1998
US 5919430	A	06-07-1999	DE 19624340 A	08-01-1998
			BR 9703631 A	10-11-1998
			CN 1168860 A	31-12-1997
			DE 59700056 D	04-02-1999
			EP 0814058 A	29-12-1997
			ES 2132984 T	16-08-1999
			JP 10095610 A	14-04-1998
			SG 52988 A	28-09-1998
WO 0015551	A	23-03-2000	EP 0987220 A	22-03-2000

# PATENT COOPERATION TREATY

## PCT


### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

14  
REC'D 13 NOV 2001

WIPO

PCT

Applicant's or agent's file reference <b>415000-</b>	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. <b>PCT/US00/07094</b>	International filing date ( <i>day/month/year</i> ) <b>16 March 2000 (16.03.2000)</b>	Priority date ( <i>day/month/year</i> ) <b>07 September 1999 (07.09.1999)</b>
International Patent Classification (IPC) or national classification and IPC <b>IPC(7): C01B 33/12 and US Cl.: 423/326, 327.1, 327.2, 328.1, 328.2, 329.1, 332, 334-339, 625, 628, 701-707; 502/240</b>		
Applicant <b>TECHNISCHE UNIVERSITEIT DELFT</b>		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>3</u> sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of <u>  </u> sheets.</p> <p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <li>I <input checked="" type="checkbox"/> Basis of the report</li> <li>II <input type="checkbox"/> Priority</li> <li>III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step and industrial applicability</li> <li>IV <input type="checkbox"/> Lack of unity of invention</li> <li>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li>VI <input type="checkbox"/> Certain documents cited</li> <li>VII <input checked="" type="checkbox"/> Certain defects in the international application</li> <li>VIII <input checked="" type="checkbox"/> Certain observations on the international application</li> </ul>		
Date of submission of the demand <b>05 April 2001 (05.04.2001)</b>	Date of completion of this report <b>25 October 2001 (25.10.2001)</b>	
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer  Maribel Medina Telephone No. (703) 308-0661	

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/07094

**I. Basis of the report****1. With regard to the elements of the international application:\***

- ☒ the international application as originally filed.
- ☒ the description:  
pages 1-19 as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_.
- ☒ the claims:  
pages 20-23, as originally filed  
pages NONE, as amended (together with any statement) under Article 19  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_.
- ☒ the drawings:  
pages 1-16, as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_.
- ☐ the sequence listing part of the description:  
pages NONE, as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_.

**2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.**

These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

**3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:**

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

**4. ☐ The amendments have resulted in the cancellation of:**

- ☐ the description, pages NONE
- ☐ the claims, Nos. NONE
- ☐ the drawings, sheets/fig NONE

**5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\***

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

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## V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. STATEMENT

Novelty (N)	Claims <u>1-15, 23-24</u>	YES
	Claims <u>16-22</u>	NO
Inventive Step (IS)	Claims <u>1-15, 23-24</u>	YES
	Claims <u>16-22</u>	NO
Industrial Applicability (IA)	Claims <u>1-24</u>	YES
	Claims <u>NONE</u>	NO

### 2. CITATIONS AND EXPLANATIONS

Please See Continuation Sheet



**INTERNATIONAL PRELIMINARY EXAMINATION REPORT**

International application No.

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**VII. Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

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**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the questions whether the claims are fully supported by the description, are made:

Claims 7-12 and 23-24 are objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claims 7-12 are indefinite for the following reason(s):

Claim 7 recites the limitation "the glycol" in line 1. There is insufficient antecedent basis for this limitation in the claim. (Note that "glycol" is either from claim 2 or claim 6).

Claim 8 recites the limitation "the inorganic oxide precursor" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 9 recites the limitation "the inorganic material" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 10 recites the limitation "the glycol" in line 1. There is insufficient antecedent basis for this limitation in the claim. (Note that "glycol" is either from claim 2 or claim 6).

Claim 11, --consisting-- should be inserted after "group".

In claim 23, line 6, "said inorganic oxide" is not clear if is referring to the inorganic oxide of the "mixture" or the one produced by "said heating".

In claim 24, it is unclear as to what the heating step is achieving, as there has not been any recitation of anything occurring due to the heating step.

In claim 24, line 6, "said compound" appears to be referring back to a compound which is formed during the heating step but there has not been no recitation of the formation of any compound during the heating thus it is not clear what "said compound" is referring to.

In claim 24, the recitation "to produce an inorganic oxide that contains micropores and mesopores", in lines 7-8, renders the claim indefinite and appears contradictory because the claim clearly indicates that it is a process to produce an inorganic oxide with substantially no mesopores.

**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

**V. 2. Citations and Explanations:**

Claims 1-15 and 23-24 meet the criteria for novelty as set out in PCT Article 33 (2)- 33(3). The closest prior art US 5,849,258 (Lujano *et al*) discloses a process for producing a crystalline material (inorganic oxide) having micropores and mesopores. A material containing micropores selected from the group consisting of metalosilicate, zeolite, among others. (See col. 4, lines 8-12) is reacted in an aqueous media with an organic compound having tensoactive properties selected to provide the mesopores in the material (See col. 4, lines 21-30). The product of the reaction is a crystalline inorganic oxide material containing micro- and mesopores. The crystalline inorganic oxide material containing micro- and mesopores obtained, is further treated to extract the organic compound, by calcination or solvent extraction. The organic compound is selected from cationic (e.g quaternary ammonium salts), anionic and non-ionic (e.g. ethoxylated amines, amine oxides) surfactants. During the nuclei aggregation of the material with the organic compound either or both electrostatic forces and van der Waal's forces provide the interaction between them (See col. 5, lines 1-20). The crystalline inorganic oxide material containing micro- and mesopores product may also contain materials such as *alumina*, *silica*, *silica-alumina*, etc. (See col. 6, lines 43-66). It is disclosed in col. 7, lines 1-11 that the starting material nuclei may be prepared by adding a template such as mono, di, tri and tetra-alkyl amines. It is also disclosed in col. 7, lines 54-65, that noble metals, Group VIII metals or Group VI may be added to the material to enhance the catalytic activity of the material.

Lujano fails to disclose or suggest using at least compound that binds to the inorganic oxide by "hydrogen bonding."

Claims 16-22 lack novelty under PCT Article 33(2) as being anticipated by US 5,849,258 (Lujano *et al*).

Lujano discloses applicants' product. Lujano discloses a crystalline material comprising micropores and mesopores. The micropores size ranges from 3 Angstroms to about 15 Angstroms, and have a pore volume of at least about 0.15 cc/g. The mesopores size ranges from about 20 Angstroms to about 100 Angstroms, and have a pore volume of at least about 0.1 cc/g (See col. 3, lines 50-60). It is disclosed in col. 3, lines 60-68 that the material is further characterized by an x-ray diffraction pattern which exhibits at least two lines at d-spacings of less than 15 Angstroms, by the presence of an absorption band between 540  $\text{cm}^{-1}$  and 750  $\text{cm}^{-1}$  in an infrared spectrum and/or by ion-exchange capacity higher than 0.05 mili-equivalents per gram of material on a dry basis.

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**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

Lujano does not disclose the specific percentage of pore volume amount of micropores, based on micro- and mesopores. However, Lujano does disclose the minimum amount of pore volume of micropores (at least about 0.15 cc/g ) and the minimum amount of pore volume of mesopores (at least about 0.1 cc/g ) from this data, one of ordinary skill in the art can determine that the percentage of micropores falls in the range disclosed in applicants' claim 16.

Lujano does not disclose the BET surface area of the crystalline material, however it is inherent that the material would have a surface area that is in the range disclosed in applicants' claim 17 (BET Surface area from 50 to 1250 m<sup>2</sup>/g ) since the product disclosed in applicants' claims have the same properties of the one disclosed in Lujano's.

Claims 1-24 meet the criteria set forth in PCT Article 33(4) for industrial applicability since the product can be used in petroleum chemistry.

----- NEW CITATIONS -----